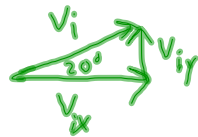
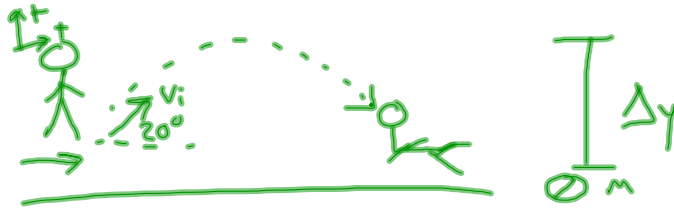


Projectile Motion Practice Problems AP Physics 8.30.11

A long jumper leaves the ground at an angle of 20.0 degrees above the horizontal and at a speed of 11.0 m/s.

- How far does he jump in the horizontal direction?
- What is the maximum height reached?



b) $\Delta y = ?$ $v_{iy} = 3.76 \text{ m/s}$

$a_g = -9.8 \text{ m/s}^2$ $v_{fy} = 0 \text{ m/s}$

$$v_{fy}^2 = v_{iy}^2 + 2a_g\Delta y$$

$$\Delta y = \frac{-v_{iy}^2}{2a_g}$$

$$= .721 \text{ m}$$

a) $\Delta x = ?$ $v_{ix} = 10.34 \text{ m/s}$

$a_x = 0 \text{ m/s}^2$ $t = ?$

find time first from y-direction

$$v_{fy}^0 = v_{iy} + a_g t$$

$$t = \frac{-v_{iy}}{a_g} = \frac{-(3.76 \text{ m/s})}{(-9.8 \text{ m/s}^2)} = .384 \text{ s}$$

double for full
x-displacement

full time = .768 s

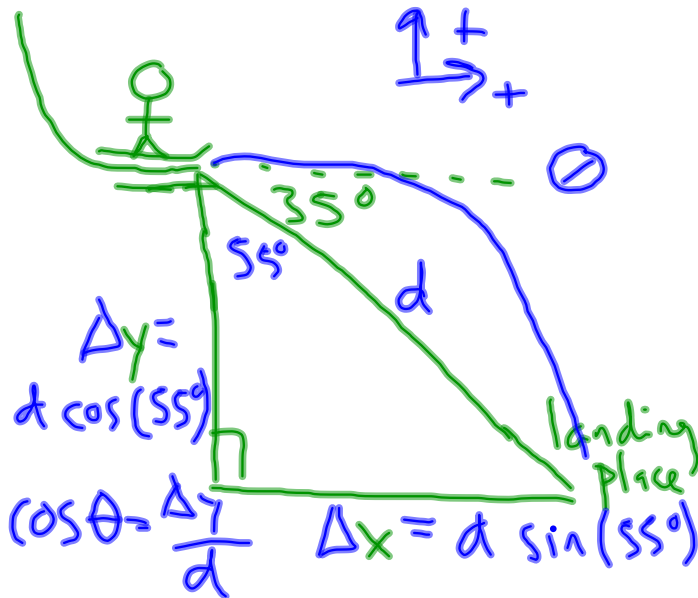
$$\Delta x = v_i t + \frac{1}{2} a_x t^2$$

$$= (10.34 \text{ m/s})(.768 \text{ s})$$

$$= 7.94 \text{ m}$$

Projectile Motion Practice Problems AP Physics 8.30.11

A ski jumper leaves the ski track moving in the horizontal direction with a speed of 25.0 m/s. The landing incline below her falls off with a slope of 35.0 degrees below the horizontal. Where does she land on the incline?



$$V_{ix} = 25 \text{ m/s}$$

$$V_{iy} = 0 \text{ m/s}$$

$$a_g = -9.8 \text{ m/s}^2$$

$$a_x = 0 \text{ m/s}^2$$

$$\Delta x = ? \quad \Delta y = ?$$

$$\Delta x = V_{ix} t + \frac{1}{2} a_x t^2$$

$$\Delta y = V_{iy} t + \frac{1}{2} a_y t^2$$

$$\Delta x = V_{ix} t$$

$$d \sin(55^\circ) = V_{ix} t$$

$$t = \frac{d \sin(55^\circ)}{V_{ix}}$$

$$\Delta y = \frac{1}{2} a_y t^2$$

$$d \cos(55^\circ) = \frac{1}{2} a_y t^2$$

$$d \cos(55^\circ) = \frac{1}{2} a_y \left(\frac{d \sin(55^\circ)}{V_{ix}} \right)^2$$

$$d = 109 \text{ m}$$

Projectile Motion Practice Problems AP Physics 8.30.11

A stone is thrown from the top of a building horizontally with an initial speed of 20.0 m/s. The height of the building is 45.0 m.

- a) How long does it take the stone to reach the ground?
- b) What is the speed of the stone just before it strikes the ground?

Projectile Motion Practice Problems AP Physics 8.30.11

A stone is thrown from the top of a building upward at an angle of 30.0° to the horizontal with an initial speed of 20.0 m/s . The height of the building is 45.0 m .

- a) How long does it take the stone to reach the ground?
- b) What is the speed of the stone just before it strikes the ground?